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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,783	08/30/2000	Shuichi Kanno	NIP-198	2461

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EXAMINER

NGUYEN, NGOC YEN M

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/651,783

Applicant(s)

KANNO ET AL.

Examiner

Ngoc-Yen M. Nguyen

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3,4,11-14,16 and 17 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 3-4, 11-14, 16-17 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

The amendment filed January 7, 2005 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: in the paragraph beginning at page 5, line 10, "[P]referably, the velocity... 10 to 30 meters per second".

Applicant is required to cancel the new matter in the reply to this Office Action.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3-4, 11-14, 16-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants are requested to point out support in the instant specification, by page and line numbers, for the limitations "wherein said mist is removed ... in said exhausting step" as required in the instant claims 3-4, 11, 13, 17.

Art Unit: 1754

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-4, 11-14, 16-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In the independent claims 3-4, 11, 13, 17, it is first required to remove decomposition products from the washed gas (note the third step, i.e., the "removing decomposition products" step), however, it is also required that "PFC decomposition products" are also removed by the step of removing the mist. It is unclear if the decomposition products in the two steps are the same products or not. If yes, it were unclear if all the decomposition products are removed in the first step, there would be no remaining decomposition product to be removed by the step of removing mist.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4, 11-14, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 885 648 in view of either JP 11-216,455 or Lang et al (6,235,256).

Art Unit: 1754

EP '648 discloses a process for decomposing fluorine compounds, comprising the steps of contacting a gas flow containing the fluorine compounds, which comprises fluorine as a halogen element, and any of the elements carbon, nitrogen and sulfur as a compound with the fluorine, with a fluorine compound-decomposition catalyst in the presence of steam to hydrolyze the fluorine compound in said gas flow, wherein said gas flow containing said fluorine compounds is contacted with a catalyst comprising Al to convert said fluorine compounds to hydrogen fluoride (note claim 1). In the equation 4 and 5 on page 3 of EP '648, when  $\text{SF}_6$  or  $\text{NF}_3$  is being decomposed,  $\text{SO}_3$  or  $\text{NO}$  is formed. In the embodiments 6 and 7,  $\text{SF}_6$  or  $\text{NF}_3$  is diluted with air or nitrogen, the resulting gas is contacted with a catalyst to decompose the fluorine compound. The decomposed gas is scrubbed in an alkaline scrubber (note page 10, lines 1-25).

EP '648 discloses that sulfur oxides such as  $\text{SO}_2$ ,  $\text{SO}_3$  and the like, and nitrogen oxides, such as  $\text{NO}$ ,  $\text{NO}_2$ , and the like, are generated in some cases. In order to neutralize and eliminate these products, a method of scrubbing the decomposed gas by spraying an aqueous alkaline solution is desirable (note paragraph bridging pages 3-4). Thus, the scrubbing step is considered as the step of removing  $\text{SO}_x$  and  $\text{NO}_x$  from the washed gas.

For the instant claim 17, this claim is read in light of the specification that there are two separate catalysts, i.e. catalyst "8" and catalyst "9", to remove different components in the PFC gas simultaneously in a single process step (note instant specification, page 14, under "(Embodiment 1)"). If claim 17 is intended to claim that there are two consecutive process steps, one for PCF decomposing process and one

Art Unit: 1754

for toxic component decomposing process, there would be no sufficient support in the instant specification for such embodiment. EP '648 discloses that the stream to be treated can contain more than one fluorine compound and the catalyst can contains at least one element selected from the group consisting of Zn, Ni, Ti, Fe, Sn, Pt, Co, Zr, Ce, and Si in additional to Al (note page 3, lines 8-15). Thus, when more than 1 element was used in addition to Al, the first element with Al is considered as the claimed "decomposition catalyst" and the second element with Al is considered as the claimed "toxic component decomposition catalyst".

The difference is EP '648 does not disclose the step of removing SO<sub>x</sub> or NO<sub>x</sub> from the decomposed gas after scrubbing by passing the gas after the scrubbing step through a cyclone or demister.

JP '455 discloses a process for treating an exhaust gas generated in a process of making printed circuit board by passing the exhaust gas through a catalytic thermal decomposition device 4 and the waste gas cleaning device 5 and discharged as a harmless exhaust gas 6 (note English abstract). As shown in Figure 3, the exhaust gas after scrubber 5 is introduced into a cyclone 8. Here the moisture within the exhaust gas is removed and recycled back to the scrubber 5 thereby minimizes the requirement of fresh scrubbing liquid. JP '455 further teaches that a demister can be used instead of a cyclone (note paragraph 0036).

For the limitation of " the removed mist is then drained through a liquid waste outlet... in the emission said of said gas exhausted in said exhausting step", since JP '455 desires to recycle the moisture back to be used as scrubbing liquid, it would have

Art Unit: 1754

been obvious to one skilled in the art to recover such moisture in the form of a liquid and it would also have been obvious to one skilled in the art to repeat the moisture removing step and to select proper equipment to effectively recover and recycle as much as possible of the moisture in the exhaust gas.

For the instant claim 16, it would have been obvious to one of skill in the art to optimize the inlet velocity to effectively remove the moisture from the exhaust gas and to select an appropriate material for the construction of the cyclone to withstand the condition of the process.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to pass the exhaust gas after the scrubbing step in EP '648 to a cyclone or demister, as suggested by JP '455, because by doing so, the moisture can be removed from the gas and recycled to the scrubber thereby minimizes the requirement of fresh scrubbing liquid. Such step would inherently remove any remaining NO<sub>x</sub> or SO<sub>x</sub> from the washed gas.

Alternatively, Lang '256 can be applied. Lang '256 discloses a process for scrubbing acid gases. In the process, the improvement is a demister arranged at a location after the liquid droplets have been sprayed by the spray means into the flow path of the flue gases (note column 3, lines 8-43 and claim 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to pass the exhaust gas of EP '648 to a demister, as suggested by Lang '256 in order to obtain the advantages as disclosed in Lang '256 (note, for example, column 1, lines 44-50).

Claims 3-4, 11-14, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno et al (PGPub US 2001/0001652) in view either JP 11-216,455 or Lang et al (6,235,256).

Kanno '652 is an US counterpart of EP '648.

Kanno '652 discloses a process as mentioned for EP '648 (note claim 1, Examples 11-12).

The difference is Kanno '652 does not disclose the step of removing NO<sub>x</sub> or SO<sub>x</sub> after the scrubbing steps.

JP '455 or Lang is applied to teach the step of passing the gas after the scrubbing step to a cyclone or demister.

Applicant's arguments filed June 23, 2005 have been fully considered but they are not persuasive.

Applicants argue that the higher-yield removal of mist considerably reduces corrosion of the exhaust pipe and the exhaust blower, and minimizes the atmospheric emission of substances.

Since the secondary references fairly teaches the desire to recycle the moisture in the exhaust, it would have been obvious to one of ordinary skill in the art to recover the most moisture possible from the exhaust gas, by doing so, the other benefits as mentioned by Applicants would inherently be present in the combined teaching of the applied references.



Applicants argue that the mist removal means defined in the present claims after amendment is supported by the description for Embodiments 1 and 2 in Applicants' specification.

In Embodiments 1 and 2 of Applicants' specification, different means of mist removal is used, however, only Figure 2B shows 2 liquid outlets. The claimed feature of having 2 liquid waste outlets only has support when the means is a cyclone. Moreover, as argued by Applicants above, the more mist being removed from the exhaust gas, the better, and the other means for removing mist disclosed in Applicants' specification provides similar or better percentage of mist removal (note Embodiments 2-4). Thus, the use a cyclone does not provide any critical or unexpected results for the process.

Applicants argue that EP '648 describes an adsorbent for adsorbing carbon monoxide, sulfur oxide and nitrogen oxide at a rear step of the exhaust gas scrubber, not prior to exhausting the gas to atmosphere as required in Applicants' claims.

Granted that it is true, however, the secondary references are applied as stated above to suggest the step of removing the mist from the exhaust gas prior to exhaust the gas to the atmosphere in order to recycle the moisture. Such mist removal step would inherently remove some of the carbon monoxide, sulfur oxide and nitrogen oxide from the gas. The claimed process does not exclude the use of the adsorbent as disclosed in EP '648.

Applicants argue that the claimed invention removes mists from the washed exhaust gas twice.

Art Unit: 1754

Again, as stated above, the secondary references fairly suggest the step of removing mist from the washed exhaust gas and it would have been within the skill of the artisan to select any known means or repeating the mist removal in order to remove as much as possible of the mist from the gas.

Applicants argue that JP '455 discloses that the washed waste gas contains moisture only and JP '455 does not disclose the decomposition of a PFC gas resulting in the decomposition of at least one of  $\text{SF}_6$  and  $\text{NF}_3$ , which are subsequently washed by contact with at least one of water and an aqueous alkaline solution.

JP '455 is not relied upon to teach the decomposition of PFC gas. In both EP '648 and JP '455, a scrubbing step is used and JP '455 teaches the step of removing the moisture of the exhaust gas from the scrubbing step and the step of recycling the recovered moisture to minimize the requirement of fresh scrubbing liquid, thus, it would have been obvious to do the same for the process of EP '648 in order to achieve the same advantage.

Applicants argue that JP '455 does not describe any concrete feature about a mist removal means as now claimed.

Apparatus limitation is given little weight without a showing of criticality or unexpected results.

The rejection using Lang as the secondary reference is maintained for the same reason as stated above.

Art Unit: 1754

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

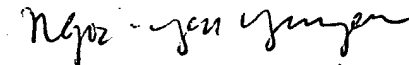
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stan Silverman can be reached on (571) 272-1358. The fax phone

Art Unit: 1754

numbers for the organization where this application or proceeding is assigned are (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed (571) 272-1700.



Ngoc-Yen M. Nguyen  
Primary Examiner  
Art Unit 1754

nmn  
September 5, 2005